May 12, 1955

Dear KELLY JOHNSON:

This is to acknowledge receipt of your note of May 2nd concerning the ability of the J57 to run continuously at military power for the duration of this special mission.

I certainly appreciate your concern in that the operating conditions are going to be more severe during this mission than any other application of the J57 with which we are acquainted. We shall keep your objective of additional altitude endurance testing in mind and try to accumulate more of it during our additional running.

I have gone over this problem with our Engineering people and am glad to report that we have already accumulated over 38 hours at conditions of military thrust and under altitude conditions of 65,000 ft. or above with inlet conditions equivalent to flight Mach number of 0.8. This has been accumulated on a number of different experimental engine models in the course of investigation and development but one single "B" engine was operated under these conditions for 11 1/2 hours without removal from the stand or maintenance work; likewise, one "C" model was operated under these conditions over 8 hours.

In addition to the above running which has been accomplished in the Willgoos Lab, the J57 engine in its various models has now been through approximately 20 150-hour type tests and during each test approximately 1/5 of the time or 30 hours was spent at maximum or military power conditions. This actually is a much more severe test from an endurance standpoint than altitude operation since the temperatures are held to the same limit in both instances but under sea level conditions the pressure level under which the engine is operating produces more severe loads.

We can also appreciate your point in suggesting the addition of a generator and air bleed in order to more nearly approach operating conditions but feel that as a practical matter we have already run many more hours than this single test would cover with generators of this capacity and greater, including airplane flight experience. As regards bleeding the air I am advised that it will be necessary to monitor the control in this application in order to hold limiting tailpipe temperature which means that either with or without air bleed the engine will be operating at basically the same limiting temperatures and hence the endurance characteristics should be unaffected.

REC. FROM [redacted] 12 MAY 1955
O.A.P.

KELLY SEEMED SATISFIED. 24 MAY 55
O.A.P.

Despite the above record we will continue development running on the "B" and especially on the "C" models. Due to the heavy work schedule we already have for development work on these and other important engine models that can only be done in the Willgoos Laboratory, we will try to accumulate this suggested test experience as a part of our other running rather than as a specific and immediate test. We will keep you posted on any test results showing bleed effect or oil heat rejection that is any different from that information which you now have.

I am pleased to hear reports that you are back in full swing on this particular project and I am sure this will help keep everything moving forward at a good pace.

Sincerely,

[redacted] 1011